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No. 85-1513

IN THE

Supreme Court of the United States

OCTOBER TERM, 1985

EDWIN W. EDWARDS, in his official capacity as Governor of Louisiana, *et al.*,

Appellants,

v.

DON AGUILLARD, *et al.*,

Appellees.

ON APPEAL FROM THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

BRIEF FOR *AMICUS CURIAE* THE NATIONAL ACADEMY OF SCIENCES URGING AFFIRMANCE

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INTEREST OF *AMICUS CURIAE*[1]

The National Academy of Sciences is the preeminent organization of scientists in the United States. A private, self-perpetuating organization, it was chartered by an Act of Congress signed into law by President Abraham Lincoln on March 3, 1863. An Act to Incorporate the National Academy of Sciences, 12 Stat. 806 (codified as amended at 36 U.S.C. §§ 25i to 254 (1982)). The charter, which establishes the Academy as a principal scientific advisor to the United States, provides that the Academy

> shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report on any subject of science or art . . . [with] no compensation whatever for services to the Goverment of the United States.

36 U.S.C. § 253.

[1] Counsel of record for the parties to this appeal have filed letters consenting to the filing of this *amicus* brief with the Clerk of the Court pursuant to Rule 36.

Working through the National Research Council, a body established by the Academy at the request of President Woodrow Wilson in 1916, the Academy and its associated organizations, the National Academy of Engineering and the Institute of Medicine, examine scientific and technological questions of national importance, typically referred to them by Congress or the Executive Branch. The Academy also undertakes, on its own initiative, studies of issues which it deems to be of importance to the development of science, including education in mathematics and science.

The Academy's members are all senior scientists, many of whom are science educators. The membership of the Academy has a strong commitment to science education in the United States at all levels. Recently the Academy has emphasized its particular concern for the state of elementary and secondary school science education. In 1982, a national convocation held by the National Academies of Sciences and Engineering focused upon the decline in performance and interest in science among elementary and secondary school students, the paucity of time devoted to science in the public school curriculum, and the critical shortage of qualified science and mathematics teachers. *See* National Academy of Sciences, *Science and Mathematics in the Schools: Report of a Convocation* (1982) (hereinafter *Science and Mathematics in the Schools)*.

The National Academy of Sciences has observed that political and social controversy has arisen in the United States because some adherents to particular religious beliefs perceive that modern science conflicts with, or is antagonistic to, their religious beliefs. The Academy does not wish to comment upon or criticize the sincerely held religious beliefs of any person. Indeed, it is the view of the Academy that science and religion represent wholly distinct spheres of human thought and experience, which should not be seen as conflicting in any way. Thus, the governing Council of the Academy stated in a 1981 resolution:

> Religion and science are separate and mutually exclusive realms of human thought whose presentation in the same context leads to misunderstanding of both scientific theory and religious belief.

The Academy has long been aware, however, that some persons who believe that the Bible is an historical document which is literally true are disturbed by scientific findings that have confirmed the essential validity of the theory of evolution developed by Charles Darwin and others. Organizations formed by such persons have proposed and promoted as an antidote to the perceived antireligious effects of modern science a body of material which they have variously termed "Biblical creationism," "scientific creationism" and, most recently, "creation-science."

Through books, lectures, pamphlets and other materials, creation-science organizations, such as the Creation Research Society ("CRS"), the Institute for Creation Research ("ICR") and the Creation-Science Research Center ("CSRC") argue that "scientific" evidence and arguments support the conclusion that the universe, the world, living things, and man were created abruptly and fully formed from nothing through an instance or instances of "special creation." According to "creation-science," "special creation" occurred outside the laws of nature and cannot be accounted for by those laws or explained by natural processes. Except when urging legislatures to mandate the instruction of "creation-science" in public schools, "creation-scientists" explicitly acknowledge that "creation-science" is predicated on a belief in the literal, historical inerrancy of the Genesis account of creation.

In 1981, the governing Council of the Academy authorized the formation of a Committee on Science and Creationism to address the scientific claims of "creation-science" and its potential impact upon science education in the United States. The Committee's report, *Science and Creationism: A View from the National Academy of Sciences* (1984) (hereinafter *Academy Report: Science and Creationism*),[2] was issued after review by the governing Council. There the Academy stated:

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[2] Copies of *Academy Report: Science and Creationism* have been lodged with the Clerk of the Court.

> Confronted by [the creationist] challenge to the integrity and effectiveness of our national education system and to the hard-won evidence-based foundations of science, the National Academy of Sciences cannot remain silent. To do so would be a dereliction of our responsibility to academic and intellectual freedom and to the fundamental principles of scientific thought. As a historic representative of the scientific profession and designated advisor to the Federal Government in matters of science, the Academy states unequivocally that the tenets of "creation science" are not supported by scientific evidence, that creationism has no place in a *science* curriculum at any level, that its proposed teaching would be impossible in any constructive sense for well-informed and conscientious science teachers, and that its teaching would be contrary to the nation's need for a scientifically literate citizenry and for a large, well-informed pool of scientific and technical personnel.

Id. at 7-8 (emphasis in original).

The National Academy of Sciences, and its associated institutions, the National Academy of Engineering and the Institute of Medicine, urge the Court to affirm the rulings of the District Court and the Court of Appeals striking down the Balanced Treatment for Creation-Science and Evolution-Science Act, La. Rev. Stat. Ann. § 17:286 (West 1982) (the "Act") as an establishment of religion in violation of the First Amendment.

SUMMARY OF ARGUMENT

"Creation-science" is not science. It cannot meet any of the criteria of science. Indeed, it fails to display the most basic characteristic of science: reliance upon naturalistic explanations. Instead, proponents of "creation-science" hold that the creation of the universe, the earth, living things, and man was accomplished through supernatural means inaccessible to human understanding.

Creationism is not based on scientific research. Rather, in large measure creationists seek to discredit scientific explanations of the development of the physical and biological universe, especially the theory of biological evolution. The balance of creationists' activities are devoted to collecting "scientific evidences" that are consistent with the "creation-science model" of the relatively recent, abrupt appearance of the universe, the earth, living things, and man, in substantially the same form as they now have. Creationist arguments depend upon adoption of a "two-model approach," which incorrectly insists that all theories regarding the origin and development of the universe and its parts must be subsumed either under the "evolution-science model" or the "creation-science model." By use of the "two-model approach," creationists automatically deem criticisms of "evolution-science" to be "affirmative evidences" of "creation-science." "Creation-science" is thus manifestly a device designed to dilute the persuasiveness of the theory of evolution. The dualistic mode of analysis and the negative argumentation employed to accomplish this dilution is, moreover, antithetical to the scientific method. 7

Publications of "creation-science" organizations, the public statements of "creation-science" supporters and the legislative history of the Act itself demonstrate uncontrovertably that "creation-science" is being promoted through state legislation and other political means for religious reasons. To buttress the religious faith of their own children and to indoctrinate the children of others, creationists seek to counterbalance what they perceive to be "secular humanism" with the fundamentalist Christian belief in the inerrancy of the Genesis account of creation. The Act is a serious violation of the First Amendment's prohibition against the establishment of religion.

The Act establishes religion at the expense of science and education. The mandated inclusion of "creation-science" in public school science curricula circumscribes rather than promotes academic freedom, seriously undermines the teaching of science in the public schools, and threatens to stunt the intellectual development of generations of American children.

ARGUMENT

I

"CREATION-SCIENCE" IS NOT SCIENCE.

A. Science's Explanations of the World are Naturalistic, Testable and Tentative.

The term "science" defines a domain of human knowledge and activity within which scientists seek the systematic organization of knowledge about the composition and functioning of the universe. Scientists attempt to acquire and organize knowledge about the universe and its parts and to explain, through the formulation of *laws* and *theories* describing natural processes, the interaction and interrelationship of those parts. Among the characteristics that distinguish science from other fields of human endeavor are the goal of explaining, with ever-increasing precision, the nature of the universe in terms of uniform natural processes and relationships, and the commitment to the testing of proposed explanations by means of empirical observation and experimentation.

Science relies entirely upon naturalistic explanations. It is not concerned with supernatural or occult explanations which are, by definition, excluded from the realm of science.

Because science is grounded in observable facts, empirical observations inconsistent with a scientific proposition will compel modification or abandonment of that proposition. A hallmark of a scientific proposition is that it is capable of disproof; it is subject to being falsified by empirical observation. If no test can be conceived that could prove a proposition wrong, it is not a proposition of science.

The priority given to empirical observation and testing means that scientific explanations are necessarily tentative. A large portion of the activity of scientists is devoted to efforts to modify explanations so as to improve the accuracy with which those explanations account for observations.

Scientific explanations of specific phenomena are expected to generate predictions about related phenomena, about the

outcome of future activities or events, or about past occurrences. The predictive capacity of scientific explanations enables scientists to generate new applications of existing explanations. These predictions yield opportunities to test the accuracy of the scientific explanation in question and may result in the falsification of the explanation.

Scientific explanations are ordered according to the extent to which they have withstood empirical testing. Newly formulated explanations are called *hypotheses*. Hypotheses are possible explanations of particular observed phenomena and are used as guides for exploring those phenomena and for generating tests by which the accuracy of the hypotheses can be verified or falsified. A proposed explanation which is incapable of generating new information, or of being tested empirically, is called an *ad hoc* hypothesis. An *ad hoc* hypothesis cannot stimulate research or expand scientific understanding and is usually discarded.

An hypothesis that has yielded significant advances in understanding, has enabled scientists to order and explore a range of related phenomena, has survived repeated opportunities for disproof in the course of exploring its predictions, and has been supported by the gathering of substantial observational or experimental data, may develop into a *theory*. Scientists use a theory as a provisional model for explaining the nature of, and relationships within, an entire set of related phenomena. Although remaining subject to modification to improve its "fit" to relevant empirical facts, a theory is held with a high degree of confidence and is unlikely to be abandoned unless superseded by another model with greater explanatory force, which is capable of ordering, explaining and predicting observed phenomena at least as well as the existing theory, but is capable of generating more fruitful research problems or approaches.

Higher levels of generalization are formulated into scientific *laws*. A law identifies a class of regularities in nature from which there has been no known deviation after many observa-

tions or trials. It is often expressed mathematically. Laws are generally valuable for their predictive capacity.

The development of the Copernican hypothesis that the earth revolves around the sun, which replaced the Ptolemaic earth-centered system of astronomy, provides an excellent example of the means by which scientific explanations are formed and modified and give rise to new and more accurate explanations. For more than fourteen centuries the Ptolemaic theory was used by astronomers to formulate calendars and predict the positions of planets and stars at particular times. Ptolemy's model, however, incorrectly predicted certain aspects of planetary motion and failed to determine accurately the appropriate length for the calendar year. Although astronomers modified the Ptolemaic system to account for these discrepancies with some success, Copernicus' model, introduced in the sixteenth century, was simpler than Ptolemy's system and had broader application. After Kepler refined the model and formulated his laws of planetary motion, the Copernican theory had substantially greater accuracy and predictive power than the Ptolemaic system and became universally accepted.

Science welcomes new discoveries and ideas. Scientists operate within a system designed for continuous testing of ideas, in which modifications of existing ideas and new ideas are announced in publications, after having been reviewed by panels of other scientists. Indeed, since the publication of Darwin's *Origin of Species by Means of Natural Selection* in 1859 the scientific understanding of the history of our biological world has changed a great deal. Nonetheless, the basic theory of biological evolution has withstood the test of numerous empirical observations and has led to numerous new developments. Furthermore, the theory of evolution has accurately predicted new discoveries in areas such as paleontology, biology and genetics. Evolution is the unifying force behind modern biological sciences and has proved capable of explaining and predicting the vast range of phenomena that make up life on earth.

For example, very recent studies in molecular biology have independently confirmed the judgments of paleontologists and classical biologists, made on the basis of the evolutionary model, about relationships among lineages and the order in which species appeared within lineages. These studies have also provided detailed information about the mechanisms of biological evolution.

DNA (deoxyribonucleic acid), the hereditary material within all cells, and the proteins encoded by genes in the DNA both offer extensive information about the ancestry of organisms. Analysis of such information has made it possible to reconstruct evolutionary events that were previously unknown and to confirm and date events already surmised but not precisely dated.

The *degree* of similarity in the sequence of nucleotides in DNA (or of amino acids in proteins) can now be precisely quantified. For example, the protein cytochrome-*c* in humans and chimpanzees consists of the same 104 amino acids in exactly the same order, whereas that of rhesus monkeys differs from them by one amino acid, that of horses by 11 amino acids, and that of the tuna by 21 amino acids. The extent of deviation corresponds to the time interval since fish, mammals and human ancestors appeared in the geological record, *i.e.*, the degree of divergence reflects the time that has passed since the respective lineages branched out from a common ancestry. Thus, inferences from paleontology, comparative anatomy and other disciplines as to the evolutionary history of organisms can be tested by examining the sequences of nucleotides in the DNA or the sequences of amino acids in protein. The potential power of such tests is overwhelming. Each of the thousands of genes and proteins provides an independent test of evolutionary history.

Only a few of the countless possible tests have been performed, of course. But of the many hundreds that have been conducted, none has provided evidence contrary to the concept of evolution. Instead, molecular biology confirms the

idea of common descent in every aspect as a vitally important unifying *scientific* concept based upon *natural* processes. *Academy Report: Science and Creationism, supra,* at 20-22.

B. The "Creation-Science" Explanation of the World is Supernatural, Untestable and Absolutist.

A threshold question that must be addressed is the content of "creation-science." The Act does not provide an independent definition of "creation-science" unique to the Louisiana school system. Rather, it defines "creation-science" only as "the scientific evidences for creation and inferences from those scientific evidences." Act, § 17:286.3(2). The Act, however, mandates that each city and parish school board develop a "creation-science" curriculum based upon resource material provided by an appointed panel of "creation-scientists" drawn from colleges and universities in Louisiana. Thus, the Act plainly refers to an existing corpus of "creation-science" materials to give content to the minimal definitions of "creation-science" contained in the Act.

The legislative history of the Act supplies some direct insights into the content of "creation-science." The original text of Senate Bill No. 86 (1981) (which, with amendments, became the Act), as submitted by Senator Keith, contained the following definition of "creation-science:"

> Creation-science includes the scientific evidences and related inferences that indicate: (a) sudden creation of the universe, energy and life from nothing; (b) the insufficiency of mutations and natural selection in bringing about development of all living kinds from a single organism; (c) changes only within fixed limits [of] originally created kinds of plants and animals; (d) separate ancestry for man and apes; (e) explanation of the earth's geology by catastrophism, including the occurrence of a worldwide flood; and, (f) a relatively recent inception of the earth and living kinds.

JA E-298-99.[3]

Shortly before he accepted an amendment to the Act to delete the definitions of "creation-science" and "evolution-science" as excess verbiage, Senator Keith addressed the Senate Education Committee. He said that "creation-science" included, among other things, a "law" of "biogenesis," holding that "life comes only from life."[4] JA E-424. According to Senator Keith, "an instant beginning" for the world and the universe is among the tenets of "creation-science," as is the proposition that "when man appeared in the fossil record he was always a man. He was never part monkey and part man . . . ." JA E-425. Finally, Senator Keith testified that "creation-science" teaches that the earth's magnetic field proves that "the earth is not nearly old enough to have accommodated all the concepts that scientists have told us about evolution . . . ." JA E-427.

The legislative history also contains materials which were provided to the Louisiana Joint Subcommittee on Elementary, Secondary and Vo-Tech Education by representatives of the Pro-Family Forum, testifying on behalf of Senator Keith's first "creation-science" bill, Senate Bill No. 956 (1980). These materials outline the nature of "creation-science" and give a bibliography of materials about "creation-science" available from the ICR. The outline of "creation-science" provided by the Pro-Family Forum is substantially similar to the definition of "creation-science" contained in the original text of Senate Bill No. 86. *Compare* JA E-298-99 *with* JA E-182-89.

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[3] This definition was part of the text of a model act drafted by Paul Ellwanger and enacted without substantial amendment in Arkansas as Act 590, which was declared unconstitutional by the United States District Court for the Eastern District of Arkansas. *McLean v. Arkansas Bd. of Educ.*, 529 F. Supp. 1255, 1261 (E.D. Ark. 1982). *See* JA E-749-52 (letter of Ellwanger to Senator Keith enclosing model act); JA E-108-21 (text of model act). (Citations in the form "JA E- " are to the designated pages of Section E of the Joint Appendix filed by the parties to this appeal.)

[4] According to Senator Keith, "Biogenesis effectively kills the concept of evolution." JA E-424.

A review of "creation-science" material reveals that as an explanation for the origin of the universe, the earth, all living things, and man, "creation-science" relies upon an act of "special creation" by a Creator exercising supernatural powers, prior to the inception of the natural processes which operate today. The Pro-Family Forum summary of "creation-science," included in the legislative history of the Act, states:

> The creation model postulates that all the basic systems of nature, including elements, stars, planets, life and the major kinds of organisms, including man, were created fully developed by supernatural creative processes during a primeval period of special creation, following which conservative (rather than creative) processes were established to govern the completed creation.

JA E-169. The Pro-Family Forum relies upon *Scientific Creationism (Public School Edition)* (H. Morris, ed. 1974), for this description. JA E-172.[5]

Despite the claims of its proponents, "creation-science" does not, and cannot, display the characteristics of science. "Creation-science" does not employ naturalistic explanations. It is not testable or falsifiable by empirical observation or experimentation. Instead, it is an *ad hoc* effort to harmonize empirical data with a religiously prescribed model of the abrupt, supernatural origin of the universe, the earth, life, and man. Because it is based on religious revelation, "creation-science" is not tentative or subject to modification or abandonment. Finally, because it relies on a specially acting supernatural power, "creation-science" has no power to predict or explain phenomena in the natural world, the world of science.

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[5] Morris is the director of the ICR, determined by Judge Overton to be "[p]erhaps the leading creationist organization." *McLean*, 529 F. Supp. at 1259. The ICR is the sole source for specific creationist texts identified in the legislative history of the Act. Senator Keith and the Pro-Family Forum identified the ICR and CRS as authoritative sources of "creation-science" information. JA E-277, E-165.

Indeed, creationists themselves recognize that the reliance of "creation-science" upon the supernatural acts of a Creator places "creation-science" outside the realm of science. Thus, Dr. Edward A. Boudreaux, who calls himself a "creation-science researcher" (JA E-127) and who testified extensively on behalf of Senator Keith's first "creation-science" bill, noted in a written submission to the Louisiana Joint Subcommittee on Elementary, Secondary and Vo-Tech Education: "Creation . . . requires the direct involvement of a supernatural intelligence, and thus cannot be directly tested by the scientific method." JA E-154.[6]

Because the central postulate of "creation-science" is the exercise of supernatural powers by a Creator, "creation-science" is not subject to falsification. Rather, the adherents of "creation-science" can explain any discrepancy between empirical observations and the "creation-science" model by reference to an exercise of supernatural power.

For example, many creationists insist that the earth is only 6,000 to 10,000 years old, consistent with the seventeenth century calculations of Bishop James Ussher based on Biblical genealogies. However, the notion of a "young earth" has been falsified by empirical data. Numerous independent tests using radiometric dating have arrived at a single result: approximately 4.5 billion years. *Academy Report: Science and Creationism*, *supra*, at 12-14. In the face of this falsification of their "young earth theory," creationists argue that the rate of decay of the earth's magnetic field supports their belief in the recent

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[6] This admission is echoed in the creationist writings recommended to the Louisiana legislature. JA E-190-212. For example:

> We do not know how God created, what processes He used, for *God used processes which are not now operating anywhere in the natural universe.* This is why we refer to divine creation as Special Creation. We cannot discover by scientific investigation anything about the creative processes used by God.

D. Gish, *Evolution? The Fossils Say NO!* [*General Edition*] 42 (3d ed. 1979) (emphasis in original; cited in *McLean*, 529 F. Supp. at 1267, n.25).

origin of the earth. *See, e.g.*, statement of Senator Keith. JA E-426-27. There is, however, overwhelming evidence that the earth's magnetic field has gone through repeated cycles of decay and reversal and that its current state is not directly indicative of the earth's age. In fact, analysis of the geological record of these magnetic cycles indicates a very old age of the earth, consistent with the results of radiometric testing. *See* K. Miller, "Scientific Creationism versus Evolution," in *Science and Creationism, supra*, at 18, 24-41 (A. Montague, ed. 1984).

Nor does the empirical data support the creationist proposition that the entire universe was created instantly and simultaneously only a few thousand years ago. There is abundant evidence that the evolution of the universe has taken place over at least several billion years. Among the most striking indications of this process are the receding velocities of distant galaxies. This general expansion of the universe was first noted in the late 1920's and early 1930's by the American astronomer Edwin Hubble from his studies of the changing wavelengths of light from distant stars and galaxies. Extrapolating backwards, astronomers today estimate that the expansion probably began some 10 to 20 billion years ago. This concept of expansion from a more dense early state was dramatically confirmed in 1965, when scientists discovered faint radio static left over from the early universe. The intensity of this static was just what would be expected to result from the expansion of the universe. Confirming earlier predictions, the discovery strongly reinforced the scientific "Big Bang" theory that the universe evolved over many billions of years from an initially dense state. *Academy Report: Science and Creationism, supra*, at 11-12.

The creationist reliance upon the exercise of supernatural powers by a Creator permits them to avoid direct and unequivocal falsification of major tenets of "creation-science." Thus, some creationists claim that their faith in the recent origin of the earth and the universe need not be shaken by empirical evidence indicating great age, arguing that the Creator recently

created the earth and the universe with the *appearance* of great age.[7] This kind of *ad hoc* reliance upon supernatural power to deal with the empirical falsification of a "creation-science" postulate permits "creation-science" to account for anything, but explain nothing, and disqualifies it from consideration as science.

The explanatory power of a scientific hypothesis or theory is, in effect, the medium of exchange by which the value of a scientific theory is determined in the marketplace of ideas that constitutes the scientific community. Creationists do not compete in that marketplace, and "creation-science" does not offer scientific value.

Practitioners of "creation-science" do not undertake conventional scientific research projects. Creationist articles do not appear in refereed journals of scientific research. In general, creationists do not seek to subject their ideas to the rigorous scrutiny and peer review that characterizes the scientific community. Instead they publish their works principally in specialized journals sponsored and controlled by organizations devoted exclusively to creationism such as ICR and CRS.[8]

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[7] The argument of created apparent age was first voiced in 1857 by a religious opponent of evolutionary theory who was a contemporary of Darwin. The Reverend Philip Gosse, a naturalist and minister, reacted against the widespread circulation of a volume espousing a pre-Darwinian formulation of the concept of evolution by publishing *Omphalos*, which argued that the apparently great age of the earth, evidenced by the geological strata and the fossils, resulted from their creation in a fully developed form with only the *appearance* of age, by God. *See G. Hardin*, " 'Scientific Creationism'—Marketing Deception as Truth," in *Science and Creationism, supra*, at 159 (A. Montague, ed. 1984). *See also* N. Eldredge, *The Monkey Business: A Scientist Looks at Creationism* 92-93 (1982).

[8] The ICR is an affiliate of Christian Heritage College and is supported by the Scott Memorial Baptist Church. *McLean*, 529 F. Supp. at 1259. The ICR has stated that it is:

> engaged in an active threefold ministry—research, writing, and teaching—in the field of scientific Biblical creationism.

(footnote continued)

Finally, "creation-science" imposes a false dichotomy upon the study of the universe and its parts. Under the creationists' "two-model approach," the "creation-science model" and the "evolution-science model" are deemed to be exact opposites of each other, and the two models, taken together, are deemed to encompass all possible explanations of origins. This view bears no relation to scientific reasoning, and stifles scientific inquiry, for it denies the possibility that empirical observation may suggest new theories of even greater explanatory force. Moreover, it requires that data inconsistent with the current formulation of one model be treated as evidence supporting the opposing model, rather than as an opportunity to refine that formulation or develop a new one. Science, unlike "creation-science," refuses to impose on the world a "contrived dualism." *McLean*, 529 F. Supp. at 1266.

II
"CREATION-SCIENCE" HAS NO SECULAR ROLE IN SCIENCE EDUCATION.

The "two-model approach" embodied in the Act is not reflective of science or scientific thinking. It is, rather, a manifestation of the view of certain Christian fundamentalists

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(footnote continued)

> We are convinced this is the most effective way in which recognition of God as a sovereign Creator and Savior can be restored in our modern world, especially for the multitudes of young people in our schools who have been indoctrinated for so long with the false and harmful philosophy of evolutionary humanism.

H. Morris, letter to new subscribers of *Acts & Facts* (undated). *Acts & Facts* is the regular newsletter published by the ICR. It is sold by subscription, and is publicly available.

The CRS requires all of its members to subscribe to a "statement of belief," which includes the following:

> (1) The Bible is the written Word of God, and because we believe it to be inspired thruout [sic], all of its assertions are historically and scientifically true in all of the original autographs. To the student of nature, this means that the account of origins in Genesis is a factual presentation of simple historical truths.

McLean, 529 F. Supp. at 1259, 1260 n.7, 1269.

that there are two, and only two, religions in the world: their own, with its commitment to the literal truth of the Bible as Divine Revelation, and "secular humanism," with which they associate modern science. To creationists, the opposition of "creation-science" to "evolution-science" therefore represents a struggle between believers and non-believers. As Paul Ellwanger, the author of the model act from which the Act was derived, wrote to Senator Keith, the Act's sponsor:

> I view this whole battle as one between God and anti-God forces . . . . [T]he crux of the matter is that if evolution is permitted to continue with its monopoly in public education then, in effect, it will continue to be made to appear that a Supreme Being is unnecessary . . . . So it behooves Satan to do all he can to thwart our efforts and confuse the issue at every turn.

JA E-763-64. Echoing this view, Senator Keith told the Louisiana Senate Committee on Education:

> Gentlemen, let me tell you this. There are two religions in this world and secular humanism is one of them. And on three different occasions the U.S. Supreme Court has declared secular humanism to be a bonafide religion. Religious humanism is actually entitled, in the state of Illinois, as a religion. And I would only remind you gentlemen that evolution is the cornerstone of that religion.

JA E-418.

Although creationists sometimes deny that "creation-science" is religious, particularly when attempting to inject it into public schools, they concede that it cannot be taught without reference to "a God, or Creator." *See, e.g., Scientific Creationism (Public School Edition)* 4 (H. Morris, ed. 1974) ("The only aspect of supernaturalism that needs to be mentioned at all is that the creation model does presuppose a God, or Creator, who did create things in the beginning.")

A comparison of the "public school" editions of creationist elementary and secondary textbooks with the "general" editions demonstrates that, even when attempts are made to adapt or secularize it for public school consumption, "creation-science" has an unmistakably religious subtext. Brief excerpts from D. Gish, *Evolution? The Fossils Say NO!* [*General Edition*] (3d ed. 1979), compared with the "public school" edition, illustrate this point:

Public School Edition

The reason most scientists accept evolution has nothing to do with the evidence. The reason that most scientists accept the theory of evolution is that most scientists prefer to believe a materialistic, naturalistic explanation for the origin of all living things. *Id.* at 24 (emphasis omitted).

* * *

After many years of intense study of the problem of origins from a scientific viewpoint, I am convinced that the facts of science declare special creation to be the only *logical explanation of origins.*

Id. at 174 (emphasis in the original).

General Edition

The reason most scientists accept evolution has nothing to do with the evidence. The reason that most scientists accept the theory of evolution is that *most scientists are unbelievers, and, unbelieving, materialistic men are forced to accept a materialistic, naturalistic explanation for the origin of all living things. Id.* at 24 (emphasis in the original).

* * *

After many years of intense study of the problem of origins from *both a Biblical and* [emphasis added] a scientific viewpoint, I am convinced that the facts of science declare special creation to be the only *logical* explanation of origins.

"In the beginning God created . . ." is still the most up-to-date statement that can be made about our origins! Id. at 186-87 (emphasis in the original, except as indicated).

The words of creationists themselves demonstrate that the congruence between "creation-science" and their own religious beliefs is not coincidental. Rather, the exclusive purpose and likely effect of public school instruction in "creation-science" is the fostering of particular religious beliefs. "Creation-science" is in essence a religious apologetic, a body of material designed to defend a particular religious belief and to promote its

acceptance. For example, two leaders of the Creation-Science Research Center, described their purpose in writing a "creation-science" text as follows:

> [T]he Bible also says that the Bible and creation are to be received as true by faith (Hebrews 11:30). Nevertheless we are commanded to persuade men (2 Corinthians 5:11), using every reasonable means . . . .

R. Kofahi & K. Seagraves, *The Creation Explanation: A Scientific Alternative to Evolution* xiii (1975).

The injection of this material into the public school classroom is a serious violation of the First Amendment. It is, moreover, a First Amendment violation with inordinately harmful implications for the future of science and science education in America.

A. Mandated Instruction in "Creation-Science" as Science is Detrimental to Science Education and to Academic Freedom.

The task of elementary and secondary science education is to equip students with a basic understanding of what science is, how the scientific method operates, and what science attempts to accomplish. Science education at this level also seeks to provide students with a grasp of the central organizing concepts of science which are useful to their understanding of the natural world and to provide a foundation for the further studies of those students who choose to become scientists or engineers or to occupy other positions requiring technical training and skill. Good primary and secondary science education strives to preserve the natural curiosity and inquisitiveness of young students and to develop their capacity to imagine new solutions to problems.

Indoctrination of public school students in the static "two-model approach" creationists propound would cripple the teaching of science at basic levels. At the very least, under the "two-model approach" precious amounts of the already criti-

cally brief time devoted to public school science education would be wasted on the study of material that lacks scientific merit.[10] Moreover, the development of scientific inquiry into the development of the physical universe and living things would be curtailed by such a "two-model" curriculum, because students would be told, in effect, that the range of possible explanations has been predetermined. In addition, little, if any, attention would be paid to the development of rigorous and systematic methods of observation and evaluation of empirical data.

Instead, students would be faced with a false choice between what are presented as mutually exclusive models. Equipped only with their primitive conceptions of the way the world works and deprived of access to the unifying principles science has developed to interpret and organize empirical data, students would be asked not to think, but rather to sort piecemeal "evidences" into one category or the other. As the public school edition of a high school curriculum guide to the creationist "two-model approach" explicitly states: "The theme of the [guide] is centered around an inquiry question: 'These are the data; which model do you think these data fit best?' " R. Bliss, *Two Models, Evolution/Creation (An Introductory Module): Teacher's Guide* 1 (1976).[11]

Identifying "creation-science" with God and "evolution-science" with "non-God" or "anti-God," the "two-model

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[10] It has been reliably estimated that children in elementary schools average a mere 1.5 hours of science instruction per week; overall, only one-fifth of students who graduate from high school have completed three years of science. *Science and Mathematics in the Schools, supra,* at 4.

[11] The parallel Christian School Edition of this guide states: "This teacher's guide for 'Origins—A Two-Model Approach' intends to establish as a baseline, the first eleven chapters of the book of Genesis." Bliss, *Two Models, Evolution/Creation (An Introductory Module): Teacher's Guide, Christian School Edition 1* (1976).

approach" not only confuses the nature of science, it tilts the balance toward creationism. Creationists recognize the psychological appeal to children of the order and purpose they associate with a Creator-God, as opposed to the chaos and random matter they ascribe to "evolution-science." Thus, creationist Henry Morris writes in a "public school" text:

> Admittedly it may be difficult at this stage of inquiry to comprehend the Creator's purposes in making pulsars or spiral nebulae or dinosaurs or bedbugs . . . . At least the concept of an omnipotent, purposeful Creator provides an adequate cause to produce these and all other observable effects in the universe, whereas random matter does not.
>
> . . . .
>
> The creationist explanation not only is far more in keeping with the law of causality . . . but also gives assurance that there is real meaning and eternal purpose to existence. This conclusion is worth everything in the developing life of a child or young person.

Scientific Creationism: Public School Edition 34-35 (H. Morris, ed. 1974).

The Act does not require the teaching of either evolution or creationism, but does require that "creation-science" be taught if evolution is taught. Science teachers who wish to avoid confusing, misinforming or manipulating their students may choose to avoid areas which trigger the Act's "balanced treatment" requirement by refraining from teaching evolution altogether. Creationists would thereby have achieved the results forbidden by this Court's ruling in *Epperson v. Arkansas*, 393 U.S. 97 (1968), which held that a state could not ban instruction in evolution. Academic freedom is badly served by an Act which compels science teachers to teach, and science students to learn, material that has been found by the scientific and academic communities to be without value as science or which, alternatively, persuades them to abandon the teaching of the best theoretical framework science currently has to offer.

At the elementary and high school level, "academic freedom" does not require that students be asked to elect one or another "model" of origins. Courts have recognized that elementary and high school classrooms are not open conduits for any and all ideas. They are a specialized forum in which professional educators impart to immature minds the intellectual tools needed to enter adult society:

> Most parents, students, school boards, and members of the community usually expect the secondary school to concentrate on transmitting basic information, teaching "the best that is known and thought in the world," training by established techniques, and, to some extent at least, indoctrinating in the *mores* of the surrounding society. While secondary schools are not rigid disciplinary institutions, neither are they open forums in which mature adults, already habituated to social restraints, exchange ideas on a level of parity.

Mailloux v. Kiley, 323 F. Supp. 1387 (D. Mass.), *aff'd per curiam,* 448 F.2d 1242 (1st Cir. 1971).

The state's legitimate interest in maintaining a well-informed citizenry and an adequately trained work force, including an adequately trained pool of scientists, technicians and engineers, justifies compulsory education and the maintenance of tax-supported public schools. This justification loses force, however, when the educational process is disrupted by an irregular state intervention that lacks a legitimate pedagogical goal.

In the name of academic freedom, this Court has condemned state action that seeks to use the educational process to impose a specific ideology upon students:

> Our Nation is deeply committed to safeguarding academic freedom, which is of transcendent value to all of us . . . . That freedom is, therefore, a special concern of the First Amendment, which does not tolerate laws that cast a pall of orthodoxy over the classroom.

Keyishian v. Board of Regents, 385 U.S. 589, 603 (1967). The Act, which imposes on science education a "two-model approach" dictated by a religiously sectarian belief system, casts precisely such a pall of orthodoxy over the classroom.

In his dissent in *Board of Education, Island Trees Union Free School District No. 26 v. Pico*, 457 U.S. 853 (1982), Justice Rehnquist succinctly described the nature of the educational process in the elementary and secondary schools:

> Education consists of the selective presentation and explanation of ideas. The effective acquisition of knowledge depends upon an orderly exposure to relevant information. Nowhere is this more true than in elementary and secondary schools, where, unlike the broad-ranging inquiry available to university students, the courses taught are those thought most relevant to the young students' individual development. Of necessity, elementary and secondary school educators must separate the relevant from the irrelevant, the appropriate from the inappropriate . . . . This winnowing process . . . is fundamentally inconsistent with any constitutionally required eclecticism in public education.

Id. at 914. Here, academic freedom cannot be advanced by the legislative imposition upon science education of an approach that actively prevents educators from separating the relevant from the irrelevant or the appropriate from the inappropriate, and which hampers the effective acquisition of knowledge by preventing an orderly exposure to relevant information.

B. Mandated Instruction In "Creation-Science" Has the Purpose and Effect of Endorsing a Particular Religious Belief.

In light of its legislative history, the Act's stated "purposes of protecting academic freedom" must be seen as pretextual. The legislative history is rife with passages demonstrating that religion was the motivating force behind the Act. For example, the written testimony of the Pro-Family Forum stated:

> Exclusive teaching of evolution has the effect of establishing religious systems as state supported religions. In fact, the teaching of Scientific Creationism is essential in providing the necessary balance to the evolutionary biases presently existing . . . .

JA E-146. Senator Keith, the sponsor of the Act, likewise stated:

> I say to you that we are teaching religion in our schools and that it is unconstitutional. Either we need to take the teaching of the religion of secular humanism out of our public schools and teach neither or we need to teach both. That is the basic premise that we will present to you today.

JA E-37-38. Finally, Dr. Boudreaux, the principal "creation-science" witness to participate in the legislative hearings, stated in his written testimony:

> [T]he current state of affairs in our present educational system is that the evolution hypothesis has been amalgamated with atheistic humanistic philosophy, and the product has been clothed in the term "science." But this product is in fact a non-theistic religion with an evolutionary philosophy presented as a creed under the guise of "science," and is required to be taught in public schools . . . . Thus, it has become our official state-sanctioned religion.
>
> In the name of justice, it is requested that legislation be enacted to require that educational programs in the State of Louisiana provide both creation and evolution as acceptable models within their scientific programs of instruction.

JA E-154-55.

The perceived antagonism between religion and the scientific theory of evolution, incorrectly identified with the so-called "non-theistic religion" of "secular humanism," has long been recognized as characteristic of the particular religious views of

fundamentalists. *Epperson v. Arkansas*, 393 U.S. at 107-09 (1968); *McLean*, 529 F. Supp. at 1258-60. In *McLean*, the district court specifically found that "creation-science" was established by fundamentalists "to promote the idea that the Book of Genesis [is] supported by scientific data." *Id.* at 1259.

Fundamentalists conceive the theory of evolution as providing the foundation for all religions and philosophies that differ from fundamentalist Christian belief, and they blame it for the ills of society:

> Evolution is . . . not only anti-Biblical and anti-Christian, but is utterly unscientific and impossible as well. But it has served effectively as the pseudo-scientific basis of atheism, agnosticism, socialism, fascism, and numerous other false and dangerous philosophies over the past century.

H. Morris and M. Clark, *The Bible Has the Answer* 90 (2d ed. 1976). Indeed, "creation-scientists" look with disfavor upon any Christian belief that fails to reject the theory of evolution:

> There are many Christians who seek, by one means or another, to compromise scripture with the assumed evolutionary history of the earth and man. These theories must be examined critically . . . . The Word of God must take first priority, and secondly, the observed facts of science . . . . Each of these various compromising theories [is] unacceptable on Biblical, theological and scientific grounds. The only truly satisfactory model is the simple, literal, historical view of Genesis and science . . . .

Scientific Creationism [*General Edition*] 215 (H. Morris, ed. 1974). It can hardly be denied that "creation-science" is a reflection of the particular religious beliefs of Christian fundamentalists.

The fundamentalist argument that evolution is a religious doctrine and that its teaching in the public schools is an establishment of religion has been rejected by this and every

other court to consider the issue. *See, e.g., Epperson v. Arkansas,* 393 U.S. 97; *Wright v. Houston Indep. School Dist.,* 366 F. Supp. 1208 (S.D. Tex. 1972), *aff'd,* 486 F.2d 137 (5th Cir. 1973). The fundamentalists' consequent demand has been that "creation-science" be given equal status with evolution in the public schools so as to counteract the teaching of evolution which they have been unable to stop through legislation or litigation. The perception by fundamentalists that evolution is inimical to their religious beliefs and must be diluted, if not supplanted, by "creation-science" supplies the motivation for the adoption of the Act.

The Act unquestionably has the sole purpose and the primary effect of advancing a particular religious belief and is therefore invalid under the familiar *Lemon* test. *Lemon v. Kurtzman,* 403 U.S. 602 (1971). Although the text of the Act proclaims a secular purpose, the official legislative history belies a non-religious purpose. *See Wallace v. Jaffree,* ____ U.S. ____, 105 S. Ct. 2479, 2500 (1985) (O'Connor, J., concurring) (even where arguable secular purpose exists, "courts should find an improper purpose . . . if the . . . official legislative history . . . suggests it has the primary purpose of endorsing [religion]."). The Court is here called upon to confirm Justice O'Connor's recent observation that there can be "little doubt that our courts are capable of distinguishing a sham secular purpose from a sincere one." *Id.* at 2500. No "objective observer, acquainted with the text [and] legislative history" of the Act, could perceive it as other than a state endorsement of the religious views of Christian fundamentalists. *Id.* at 2500-01. Indeed, "it is beyond purview that endorsement of religion or a religious belief 'was and is the law's reason for existence.'" *Id.* at 2500, *quoting Epperson v. Arkansas,* 393 U.S. 97, 108 (1968).

Moreover, there is no doubt that the Act "asserts a preference for one religious denomination or sect over others." *Wallace v. Jaffree,* 105 S. Ct. at 2523 (Rehnquist, J., dissenting). Indeed, the adoption of the religiously inspired "two-model approach" is likely to prompt conflicts among religious

sects because many religions see no incompatibility between belief in a Creator and acceptance of the scientific theory of evolution. Indeed, perhaps the greatest evil fostered by the Act is that students who have never before perceived a conflict between science and their religious beliefs may be forced to choose between science and religion, impelled by the mistaken "two-model approach" to the erroneous conclusion that science denies the existence of God.

CONCLUSION

Because "creation-science" is religion rather than science and threatens the integrity and effectiveness of science education in the public schools, the National Academy of Sciences respectfully urges that the decision of the Court of Appeals upholding the District Court's declaration that the Act is unconstitutional be affirmed.

Respectfully submitted,

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